

Preliminary Amendment (Section 1.173B)  
Reissue of U.S. Patent No. 6,312,494  
U.S. Appln No. 09/610,476

**AMENDMENTS TO THE SPECIFICATION**

**Please delete the present Abstract of the Disclosure and replace it with the following new Abstract of the Disclosure.**

A thin arc segment magnet made of [a] an R-T-B based, rare earth sintered magnet substantially comprising 28-33 weight % of R and 0.8-1.5 weight % of B, the balance being substantially [Fe] T, wherein R is at least one rare earth element including Y, and T is Fe or Fe and Co, which has an oxygen content of 0.3 weight % or less, a density of 7.56 g/cm<sup>3</sup> or more, a coercivity iHc of 1.1 MA/m (14 kOe) or more at room temperature, and an orientation Br/4πI<sub>max</sub> of 96% or more in an anisotropy-providing direction at room temperature can be produced by using a slurry mixture formed by introducing fine alloy powder of the above composition into a mixture liquid comprising 99.7-99.99 parts by weight of a mineral oil, a synthetic oil or a vegetable oil and 0.01-0.3 parts by weight of a nonionic surfactant and/or an anionic surfactant.

**In column 3, please delete the first paragraph and replace it with the following paragraph:**

The thin arc segment magnet having a thickness of 1-4 mm according to one embodiment of the present invention is made of [a] an R-T-B based, rare earth sintered magnet having a main component composition comprising 28-33 weight % of R and 0.8-1.5 weight % of B, the balance being substantially [Fe] T, wherein R is at least one rare earth element including Y, and T is Fe

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or Fe and Co, the arc segment magnet having an oxygen content of 0.3 weight % or less based on the total weight of the magnet, a density of 7.56 g/cm<sup>3</sup> or more, a coercivity iHc of 1.1 MA/m (14 kOe) or more at room temperature, and an orientation Br/4πI<sub>max</sub> of 96% or more in an anisotropy-providing direction at room temperature.

**In column 3, please delete the third paragraph and replace it with the following paragraph:**

The radially anisotropic arc segment magnet having an inner diameter of 100 mm or less according to another embodiment of the present invention is made of [a] an R-T-B based, rare earth sintered magnet having a main component composition comprising 28-33 weight % of R and 0.8-1.5 weight % of B, the balance being substantially [Fe] T, wherein R is at least one rare earth element including Y, and T is Fe or Fe and Co, the arc segment magnet having an oxygen content of 0.3 weight % or less based on the total weight of the magnet, a density of 7.56 g/cm<sup>3</sup> or more, a coercivity iHc of 1.1 MA/m (14 kOe) or more at room temperature, and an orientation [Br// / (Br// + Br⊥)] x 100 (%) of 85.5% or more at room temperature, the orientation being defined by a residual magnetic flux density Br// in a radial direction and a residual magnetic flux density Br⊥ in an axial direction perpendicular to the radial direction.

**In column 3, please delete the fifth paragraph and replace it with the following paragraph:**

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The radially anisotropic ring magnet having an inner diameter of 100 mm or less according to a further embodiment of the present invention is made of [a] an R-T-B based, rare earth sintered magnet having a main component composition comprising 28-33 weight % of R and 0.8-1.5 weight % of B, the balance being substantially [Fe] T, wherein R is at least one rare earth element including Y, and T is Fe or Fe and Co, the ring magnet having an oxygen content of 0.3 weight % or less based on the total weight of the magnet, a density of 7.56 g/cm<sup>3</sup> or more, a coercivity iHc of 1.1 MA/m (14 kOe) or more at room temperature, and an orientation [Br// / (Br// + Br $\perp$ )] x 100 (%) of 85.5% or more at room temperature, the orientation being defined by a residual magnetic flux density Br// in a radial direction and a residual magnetic flux density Br $\perp$  in an axial direction perpendicular to the radial direction. The ring magnet preferably has portions bonded by sintering.

**In columns 3 and 4, please replace the paragraph bridging columns 3 and 4 with the following paragraph:**

The method for producing [a] an R-T-B based, rare earth sintered magnet according to the present invention comprises the steps of finely pulverizing an alloy for the R-T-B based, rare earth sintered magnet to an average particle size of 1-10  $\mu$ m in a non-oxidizing atmosphere; introducing the resultant fine powder into a mixture liquid comprising 99.7-99.99 parts by weight of at least one oil selected from the group consisting of a mineral oil, a synthetic oil and a vegetable oil and 0.01-0.3 parts by weight of a nonionic surfactant and/or an anionic surfactant;

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subjecting the resultant slurry mixture to molding in a magnetic field; and carrying out oil removal, sintering and heat treatment in this order. The R-T-B based, rare earth sintered magnet preferably has a main phase composed of an  $R_2T_{14}B$  intermetallic compound, wherein R is at least one rare earth element including Y, and T is Fe or Fe and Co. The molding in a magnetic field is preferably compression molding, and the compressed green body preferably has a density distribution of 4.3-4.7 g/cm<sup>3</sup>.

**In column 4, please replace the last paragraph with the following paragraph:**

(A) First  $R_2T_{14}B$ -type, sintered magnet

The preferred composition of the first  $R_2T_{14}B$ -type, sintered magnet comprises 28-33 weight % of R and 0.8-1.5 weight % of B, the balance being substantially [Fe] T, wherein R is at least one rare earth element including Y, and T is Fe or Fe and Co.

**In columns 5 and 6, please replace the paragraph bridging columns 5 and 6 with the following paragraph:**

(B) Second  $R_2T_{14}B$ -type, sintered magnet

The preferred composition of the second  $R_2T_{14}B$ -type, sintered magnet comprises 28-33 weight % of R, 0.8-1.5 weight % of B, and 0.6 weight % of M<sub>1</sub>, the balance being substantially [Fe] T, wherein R and T are the same as in the first  $R_2T_{14}B$ -type, sintered magnet, and M<sub>1</sub> is at

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least one selected from the group consisting of Nb, Mo, W, V, Ta, Cr, Ti, Zr and Hf. Because the second R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet is the same as the first R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet except for M<sub>1</sub>, explanation will be made only on M<sub>1</sub> here.

**In column 6, please replace the second full paragraph with the following paragraph:**

(C) Third R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet

The preferred composition of the third R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet comprises 28-33 weight % of R, 0.8-1.5 weight % of B, 0.6 weight % of M<sub>1</sub>, and 0.01-0.4 weight % of M<sub>2</sub>, the balance being substantially [Fe] T, wherein R, T and M<sub>1</sub> are the same as in the second R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet, and M<sub>2</sub> is at least one selected from the group consisting of Al, Ga and Cu. Because the third R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet is the same as the second R<sub>2</sub>T<sub>14</sub>B-type, sintered magnet except for M<sub>2</sub>, explanation will be made only on M<sub>2</sub> here.

**In column 7, please replace the sixth full paragraph with the following paragraph:**

The method for producing [a] an R-T-B based, rare earth sintered magnet according to the present invention comprises the steps of finely pulverizing an alloy for the rare earth sintered magnet to an average particle size of 1-10 µm in a non-oxidizing atmosphere; introducing the resultant fine powder into a mixture liquid comprising 99.7-99.99 parts by weight of at least one oil selected from the group consisting of a mineral oil, a synthetic oil and a vegetable oil and 0.01-0.3 parts by weight of a nonionic surfactant and/or an anionic surfactant; subjecting the

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resultant slurry mixture to molding in a magnetic field; and carrying out oil removal, sintering and heat treatment in this order.